

REMARKS

Claims 1, 3, and 4 are pending in this Application. Claim 1 has been amended. Care has been exercised to avoid the introduction of new matter. Adequate descriptive support for the present Amendment should be apparent throughout the originally filed disclosure as, for example, the second embodiment commencing at page 18 of the written description of the specification, line 12, page 20, lines 9 through 21, and page 23, lines 7 through 9. Applicants submit that the present Amendment does not generate any new matter issue.

Claims 1, 3, and 4 were rejected under 35 U.S.C. § 103 for obviousness predicated upon Shiomi in view of Brooks et al. and Nasser-Faili et al.

In the statement of the rejection the Examiner admitted that Shiomi does not disclose the power for the RIE process and does not teach adding nitrogen to the etchant gas mixture. The Examiner noted that Brooks et al. disclose the use of a mixture of oxygen and nitrogen for etching diamond, and then concluded that one having ordinary skill in the art would have been motivated to conduct the diamond etching method of Shiomi by employing nitrogen in the mixture because Brooks et al. teaches that a plasma of 100% oxygen and a plasma of oxygen and nitrogen are functionally equivalent. This rejection is traversed.

Insufficient Facts.

Initially, the Examiner is questioned as to the basis for the asserted functional equivalence of a mixture of 100% oxygen and a mixture of oxygen and nitrogen gasses. While Brooks et al. may exemplify an oxygen/nitrogen plasma as an oxygen containing gas, it is not apparent wherein 100% oxygen and a mixture of oxygen and nitrogen are disclosed as

functionally equivalent for all purposes in connection with etching diamond. *In re Mercier*, 515 F.2d 1161, 185 USPQ 774 (CCPA 1975); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Jezl*, 396 F.2d 1009, 158 USPQ 98 (CCPA 1968); *In re Naylor*, 369 F.2d 765, 152 USPQ 106 (CCPA 1966).

Applicants point out that the primary reference to Shiomi is **not** doing the same thing as Brooks et al. are doing. Shiomi seeks to fabricate a diamond article having excellent thermal and mechanical properties for use as heat sinks and tools. In that respect Shiomi is concerned with surface flatness. **Brooks et al. do not form a projection or depression.** Brooks et al. do not appear concerned with surface flatness, but merely **etch through** a thin layer of diamond to form a membrane for a **stencil mask**. Indeed, diamond is not even required. For example, silicon carbide, diamond like carbon (DLC) and amorphous carbon can also be employed (column 7 of Brooks et al., lines 6 through 9). Accordingly, whatever Brooks et al. may disclose with respect to forming a stencil mask, which may be diamond, does not automatically generate functional equivalence to achieve the objectives of Shiomi, let alone when etching to form a protrusion or depression as now claimed.

The problem element.

As pointed out in the paragraph bridging pages 1 and 2 of the written description of the specification, Shiomi's method results in tilted side faces 102S (Fig. 14B) thereby yielding an **undesirable trapezoidal cross section**. The present invention addresses and solves that problem by etching diamond to make the etched side faces substantially perpendicular, when forming a protrusion or depression. To achieve that objective an etchant gas is formulated with a

predetermined emission spectrum to achieve a high diamond etch rate vis-à-vis lateral shaving of the mask layer. In this way etched side surfaces can be made substantially perpendicular.

Applicants found and now claim the use of a gas mixture having an intensity ratio A/B which is greater than the intensity ratio A/B obtained from the emission of a plasma which is 100% oxygen, wherein A is the intensity of an emission peak caused by atomic oxygen and B is the intensity of an emission peak caused by molecular oxygen. Further, to achieve that end, nitrogen gas is employed to improve that intensity ratio A/B. This is disclosed at page 23 of the written description of the specification, lines 7 through 9 and illustrated in Fig. 6.

It should be noted that as far as the emission spectrum is concerned, a gas containing pure oxygen is **not functionally equivalent**, repeat **not functionally equivalent**, to a gas mixture containing oxygen. This should be apparent from Figs. 5 and 6.

None of the applied references express any recognition for the **problem** of tilted side surfaces when etching a protrusion or depression on the surface of a diamond body. This problem confronted and solved by Applicants is not even a blip on the radar screens of the applied references.

There is No Motivation.

In order to establish the requisite fact-based realistic motivation, the Examiner must make clear and particular factual findings as to a specific understanding or specific technological principle and then, based upon such facts, explain why one having ordinary skill in the art would have been realistically motivated to modify particular prior art, in this case to modify Shiomi's method to arrive at the claimed invention. *In re Lee*, 237 F.3d 1338, 61 USPQ2d 1430 (Fed. Cir. 2002); *Ecolochem Inc. v. Southern California Edison, Co.*, 227 F.3d 1361, 56 USPQ2d 1065

(*Fed. Cir. 2000*); *In re Kotzab*, 217 F.3d 1365, 55 USPQ 1313 (*Fed. Cir. 2000*); *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (*Fed. Cir. 1999*). Further, the requisite motivation must be undertaken with a reasonable expectation of successfully achieving a recognized objective. *Velander v. Garner*, 348 F.3d 1359, 68 USPQ2d 1769 (*Fed. Cir. 2003*); *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (*Fed. Cir. 1991*).

Applicants stress the basic motivational principle enunciated by the Court of Appeals for the Federal Circuit in *Ecolochem Inc. v. Southern California Edison, Co.*, *supra*, at 1076:

“... there must still be evidence that ‘a skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.’ *In re Rouffet*, 149 F.3d at 1357, 47 USPQ2d at 56; *see also In re Werner Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (*Fed. Cir. 2000*). . . .”

The above principle was recently confirmed by the Court in *Abbott Laboratories v. ANDRX Pharmaceuticals, Inc.* (*Appeal No. 05-1433*) on June 22, 2206, when the Court quoted with approval from *In re Kahn*, 441 F.3d 977, 988 (*Fed. Cir. 2006*):

This ‘motivation-suggestion-teaching’ test asks not merely what the references disclose, but whether a person of ordinary skill in the art, processed with the understandings and knowledge reflected in the prior art, and **motivated by the general problem facing the inventor**, would have been led to make the combination recited in the claims (Emphasis supplied).

In applying the above legal tenets to the exigencies of this case, Applicants submit that a *prima facie* basis to deny patentability to the claimed invention has not been established for lack of the requisite motivational element. Specifically, one having ordinary skill in the art would have no reason to look to Brooks et al. to solve any problem associated with etching to form a projection or depression, particularly since neither Brooks et al. nor Shiomi appreciate the tilting side surface problem. Further, neither Brooks et al. nor Shiomi provide any suggestion whatsoever to **control the amount of nitrogen to achieve the predetermined emission**

spectrum (A/B) specified in independent claim 1. This predetermined emission spectrum is **functionally equivalent** in controlling the side surfaces of the protrusion or depression such that they are substantially perpendicular, i.e., have an angle of inclination of at least 78°, as also recited in claim 1. The mere use of an oxygen/nitrogen mixture to etch a diamond membrane to form a mask can hardly be considered motivation to go back to Shiomi's method and control the taper of the side surfaces, particularly where there is no mention of that problem in the applied prior art or the relationship of nitrogen in solving that problem. Indeed, Brooks et al. do not even seek to form a protrusion or depression. The tertiary reference to Nasser-Faili et al. does not cure the previously argued deficiencies in the attempted combination of Shiomi and Brooks et al., noting that Nasser-Faili et al. do not even employ nitrogen gas but a nitrogen compound.

Based upon the foregoing Applicants submit that a *prima facie* basis to deny patentability to the claimed invention under 35 U.S.C. § 103 has not been established for lack of the requisite factual basis and want of the requisite realistic motivation. Applicants, therefore, submit that the imposed rejection of claims 1, 3, and 4 under 35 U.S.C. § 103 for obviousness predicated upon Shiomi in view of Brooks et al. and Nasser-Faili et al. is not factually or legally viable and, hence, solicit withdrawal thereof.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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